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TABLE 103. KENTON COUNTY WATER DISTRICT LABOR COST ANALYSIS

Item	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Total payroll (\$)	151,360	157,208	159,593	171,120	191,812	207,238	223,933	242,152	200,249	271,302
Total hours on payroll	47,000*	48,500	55,450	53,300	46,750	49,900	57,258	57,641	56,480	55,529
Revenue-producing water (mil gal)	1,138	1,228	1,381	1,505	1,625	1,764	1,888	1,980	2,152	2,259
Total payroll/mil gal RPW (\$)	133.00	128.01	115.56	113.70	118.03	117.48	118.63	122.29	93.05	120.09
Total hours/mil gal RPW	41.30	39.49	40.15	35.74	28.76	28.28	30.32	29.11	26.24	24.58
Average cost/man-hour (\$)	3.22	3.24	2.87	3.18	4.10	4.15	3.91	4.20	3.54	4.88

\* Estimated.

TABLE 104. KENTON COUNTY WATER DISTRICT CAPITAL AND OPERATING COSTS

Item	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Operating expenses	\$299,092	\$323,313	\$347,215	\$358,423	\$386,950	\$432,000	\$468,401	\$530,841	\$532,860	\$614,454
Depreciation	16,339	26,600	32,118	34,676	37,835	47,458	58,907	58,664	67,142	110,771
Interest*	105,712	104,497	103,237	101,942	100,612	99,212	96,802	96,322	94,772	165,492
Total	421,143	454,410	482,570	483,833	525,397	578,670	624,110	685,827	694,774	890,717
Total cost/mil gal RPW	370.07	370.04	349.77	321.48	323.32	328.04	330.57	346.38	322.85	394.30

\* Includes \$72,280.00 for interest on bank notes in 1974.

TABLE 105. KENTON COUNTY WATER DISTRICT CAPITAL VERSUS OPERATING EXPENSE RATIOS

Item	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Operating expense (\$)	299,092	323,313	347,215	358,423	386,950	432,000	468,401	530,841	532,860	614,454
Capital expense (\$)	122,051	131,097	135,355	125,410	138,447	146,670	155,709	154,986	161,914	276,263
Total (\$)	421,143	454,410	482,570	483,833	525,397	578,670	624,110	685,827	694,774	890,717
Operating expense as % of total	71.02	71.15	71.95	74.03	73.65	74.65	75.05	77.40	76.70	68.98
Capital expense as % of total	28.98	28.85	28.05	25.92	26.35	25.35	24.95	22.60	23.30	31.02

## SYSTEM COSTS

Examination of costs on a functional basis is only part of the total picture. Because the purpose of the water utility is to deliver water to a customer, it is important to present costs as they relate delivery of water to a demand point within the system. For this reason, the functional categories, both operating and capital, are reaggregated and assigned to physical components in the system. This section contains such an analysis of the water supply system costs.

The locations of the Kenton County facilities are shown in Figure 53. The booster station (5) is where the Kenton County Water District connects with the Covington water utility and is considered an emergency water source.

To analyze the cost of water as it moves through acquisition to treatment to the consumer, it is necessary to identify the capital and operating cost of each system component. Figure 54 is a schematic diagram of Figure 53 and shows the operating and capital costs for each of the system's major facilities. A linear assumption allows the unit cost (\$/mil gal) to be added as water moves from one component of the system to another. Total incremental cost is \$157.01 for providing water to pressure zone 3 (see Table 106).

Added to the incremental costs are the distribution, interest, and support services costs. Distribution is calculated on the assumption that these unit costs (\$/mil gal) are constant throughout the system; therefore, the total capital and operating cost for distribution is divided by the number of gallons of RPW in the year under consideration, yielding a figure of \$92.91/mil gal. The same approach is taken for interest and support services. When these are added, a total cost/mil gal to a given zone results. For example, the total cost for water delivered to Area 3 is \$404.81/mil gal.

Once these calculations are made and various cost zones are established, the costs versus charges can be examined. Table 107 summarizes the Kenton County Water Utility quarterly rates. Billed consumption of water for the 10 largest consumers served by the water district is shown in Table 108.

By comparing each user's location with the cost allocation table, it is possible to identify the actual allocated cost of delivering water to a specific customer. Figure 55 is a schematic presentation showing that many of the major users are located at the extreme limits of the system. Kenton County Water District is, for the most part, recovering the cost of producing the water. An exception is the City of Florence, which is the largest user.

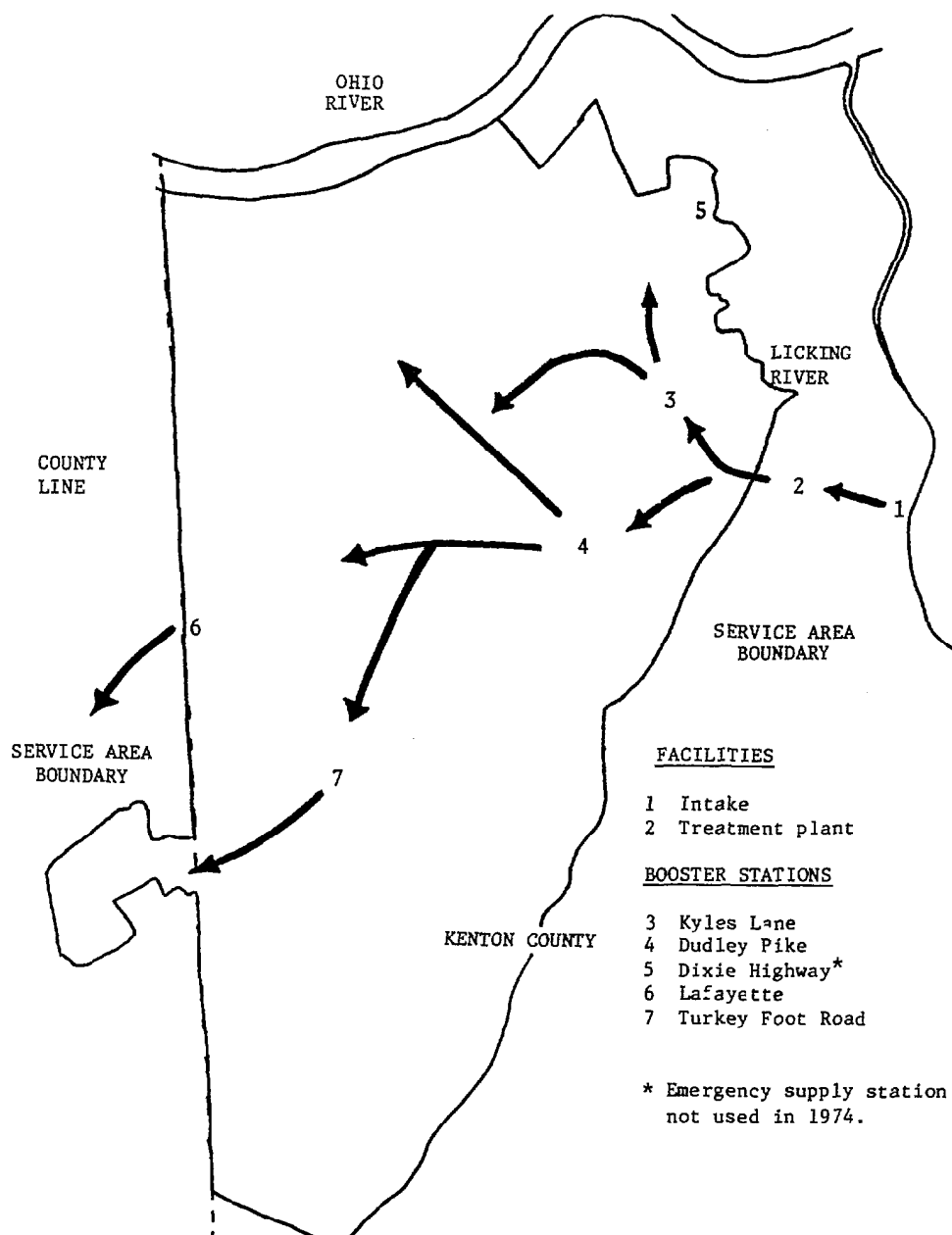


Figure 53. Kenton County Water District facilities  
(arrows show general direction of flow).

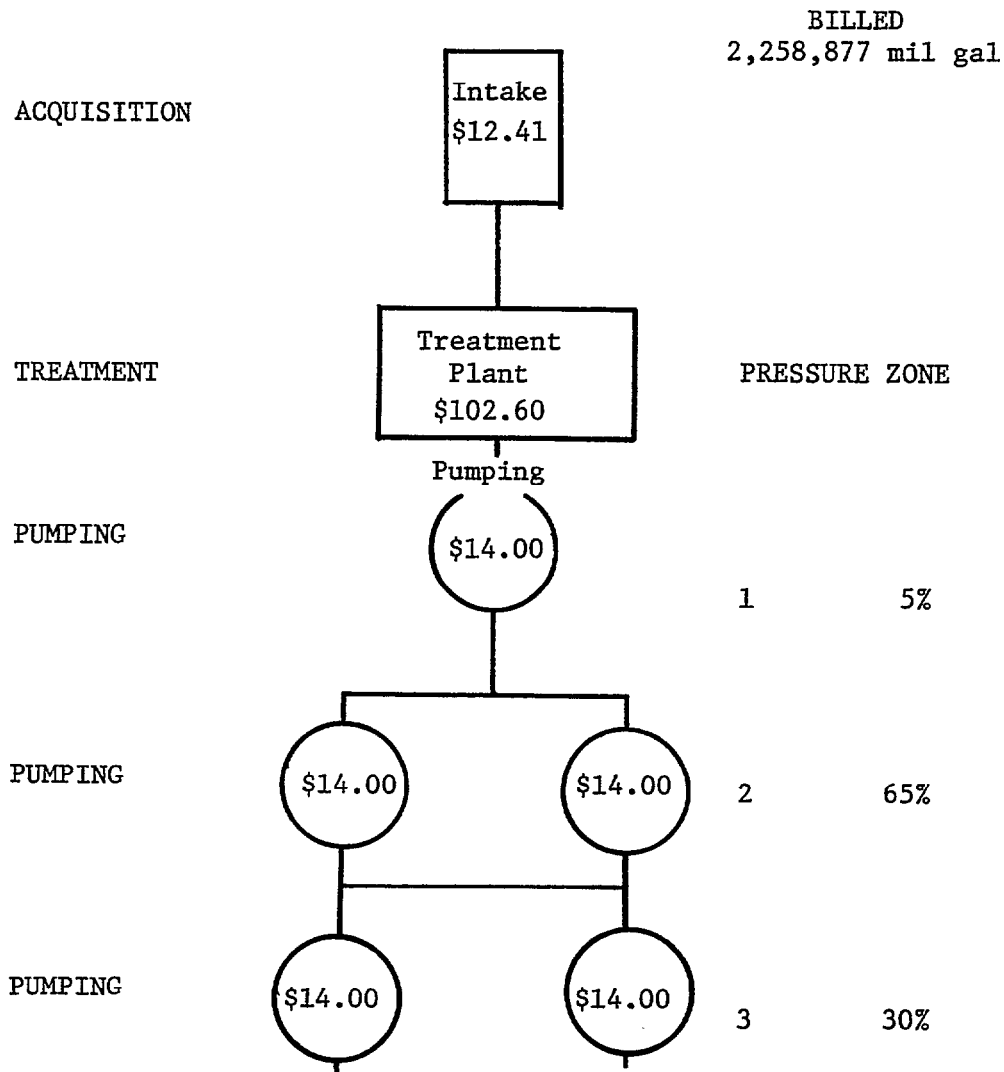


Figure 54. Kenton County Water District allocation of capital and operating costs to water system components (\$/mil gal RPW).

TABLE 106. KENTON COUNTY WATER DISTRICT COST ELEMENTS BY ZONES

Zone	Incremental cost (\$/mil gal)	Distribution cost (\$/mil gal)	Interest (\$/mil gal)	Support services cost (\$/mil gal)	Total cost (\$/mil gal)	RPW* (mil gal)	Revenue
1	\$129.01	\$92.91	\$73.26	\$81.63	\$376.81	112.94	\$42,556.92
2	143.01	92.91	73.26	81.63	390.81	1,468.28	573,818.51
3	157.01	92.91	73.26	81.63	404.81	677.66	274,323.54
Total	---	---	---	---	---	2,258.88	890,698.97

\* No flows available. Based on 5% area 1, 65% area 2, 30% area 3.

TABLE 107. KENTON COUNTY WATER DISTRICT NO. 1 QUARTERLY RATES

Units used (cu ft)	Rate (\$/cu ft)
First 800	\$0.50*
800-5,000	.40
Over 5,000	.30

\* Minimum is \$4.

TABLE 108. KENTON COUNTY WATER DISTRICT 10 MAJOR USERS

Major User	High or low Quarter	Quarter	Units used (mil gal)	Amount billed	Unit charge (\$/mil gal)	Cost zone
City of Florence	High	3	121.4	\$35,316.12	\$290.89	3
	Low	1	104.21	31,178.82	299.18	
Kenton Co. Airport Bd.	High	3	28.4	8,390.50	295.59	2
	Low	1	9.5	3,827.80	401.68	
Grefco, Inc.	High	3	17.2	6,886.20	401.07	3
	Low	2	14.9	5,962.20	401.07	
Signode Corporation	High	2	12.3	4,937.80	401.54	3
	Low	4	7.9	3,177.10	401.80	
Swedlo	High	2	10.3	4,150.90	401.63	3
	Low	1	7.4	2,982.70	401.85	
KY Jockey Club	High	2	9.8	3,954.40	401.66	2
	Low	3	6.5	2,615.20	401.96	
Nat. Ind. Containers	High	2	7.0	2,821.00	401.90	3
	Low	4	5.6	2,257.90	402.10	
S H Golf Club, Inc.	High	2	6.7	2,691.40	401.94	2
	Low	4	0.5	186.70	413.93	
Cincinnati Rowntowner	High	3	5.9	2,371.30	402.05	2
	Low	1	3.1	1,258.00	402.93	
Holiday Inn Motel	High	3	5.8	2,353.30	402.06	2
	Low	1	4.1	1,642.60	402.49	

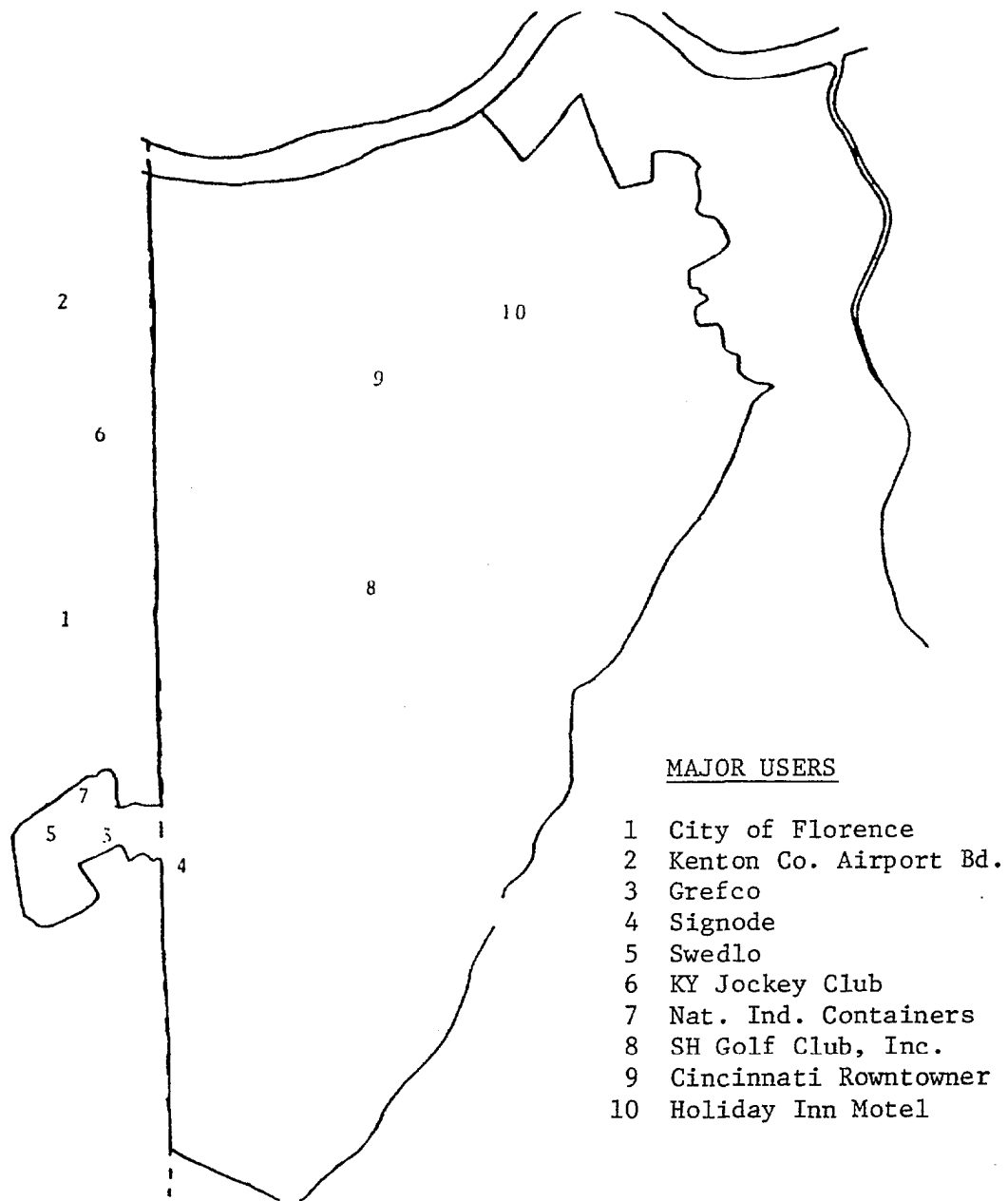


Figure 55. Kenton County Water District major users.

The average unit costs for all water supplied during the most recent year studied are given as follows:

	<u>\$/mil gal</u>
Support services-----	82
Acquisition-----	12
Treatment-----	103
Distribution-----	124
Interest-----	73
Total-----	394

## SECTION 13

### ORLANDO WATER UTILITY

The City of Orlando in Orange County is located in the central part of the State of Florida. In 1974, the population of the county was 422,190, and the City of Orlando was just over 100,000. The projected growth rate of the Orlando metropolitan area is one of the highest in the nation, but the actual increase is falling short of the projections. As a matter of fact, county population decreased slightly between 1974 and 1975. The City of Orlando is surrounded in part by other incorporated areas, but room exists for growth to the south, east, and southwest. Table 109 includes system facts.

#### WATER SUPPLY SERVICE AREA

The Orlando Water Utility provides water on a retail basis to all classes of customers in the city and to a relatively large group of customers outside the city. All service outside the city limits is on an individual basis and is billed directly by the utility. No water is sold through master meters to other utilities.

The utility does not plan to provide water to all citizens in the county. Its expansion now and in the future will be on a case-by-case basis as deemed worthwhile to both the consumer and the utility. Figure 56 illustrates the service area boundaries.

#### ORGANIZATION

Through the Orlando Utilities, the City of Orlando provides both electricity and water to the citizens of the city and selected areas surrounding the city. The Orlando Utilities is managed by a commission reporting directly to the mayor and city council. An executive vice president and general manager are responsible for the total utilities operation. Although two separate services are involved in the organization and some specific functions are shared between the electric and the water service, other functions are completely independent. Figure 57 depicts the organizational structure of the Orlando Utilities.

As can be seen, functions such as financial operations, customer relations, and support operations are shared between the two services. The combined operations of these functions were reviewed with the utility to estimate the percentage of effort in each department that could be allocated to water. Twenty percent of the financial operations and 45% of the customer

TABLE 109. ORLANDO WATER UTILITY, BASIC FACTS (1974)

Item	Amount
Population:	
SMSA	598,692
County	422,190
Retail service area	188,652
Area of retail service area (sq miles)	90
Recognized customer classes (No. of accounts)	
Total metered customers	62,884
Percent metered	100
Purchased water	None
Source water	100% ground water
Pipe in system (miles)	958.8
Elevation of treatment plants (ft above sea level datum):	
Kirkman	99
Highland	87
Primrose	108
Pine Hills	113
Kuhl	98
Martin	102
Conway	108
Elevation of service area (min/max, ft)	75/120
Revenue-producing water (billed consumption, mil gal)	12,522
Treated water pumpage from plants (mil gal)	14,880
Maximum day/maximum hour (MGD)	73/108

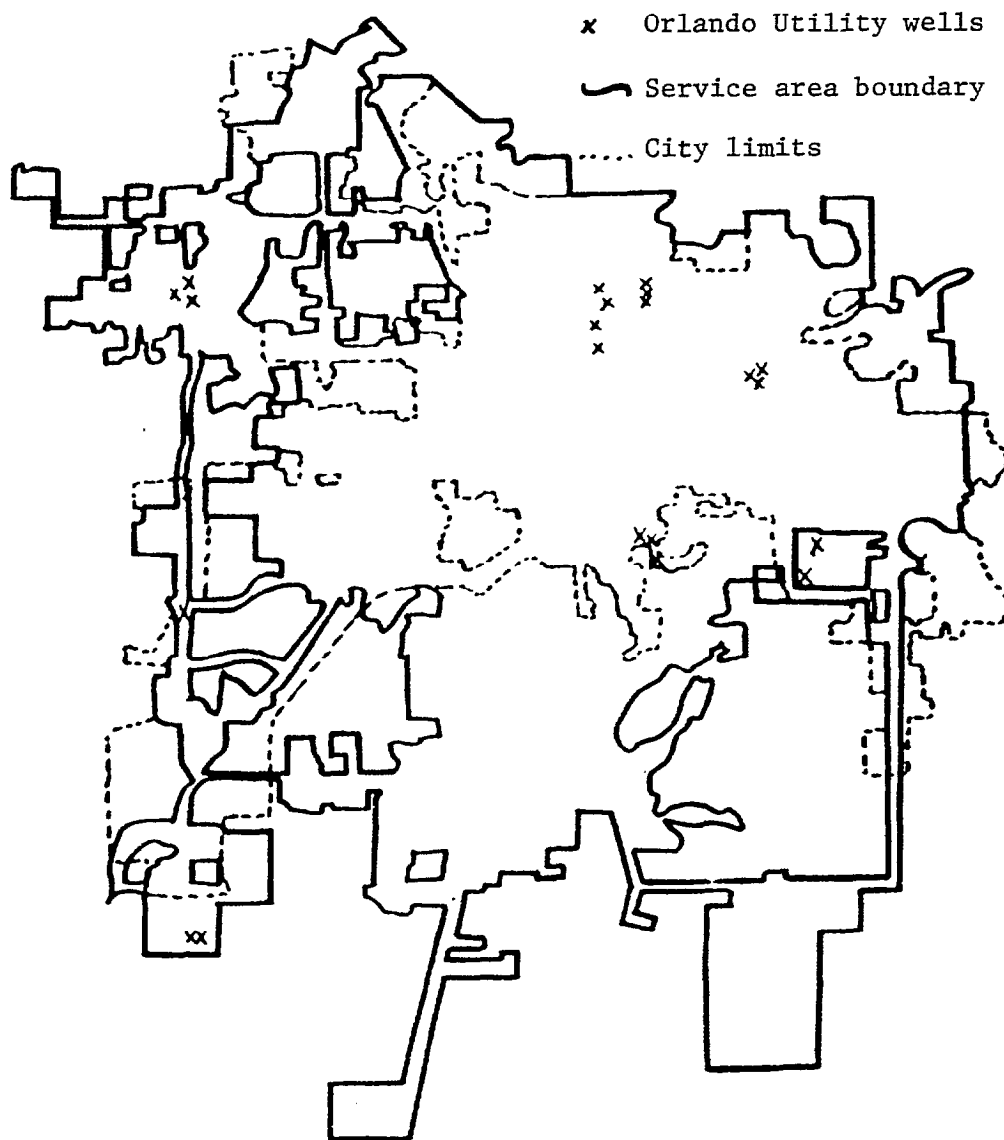


Figure 56. Orlando Water Utility source water map.

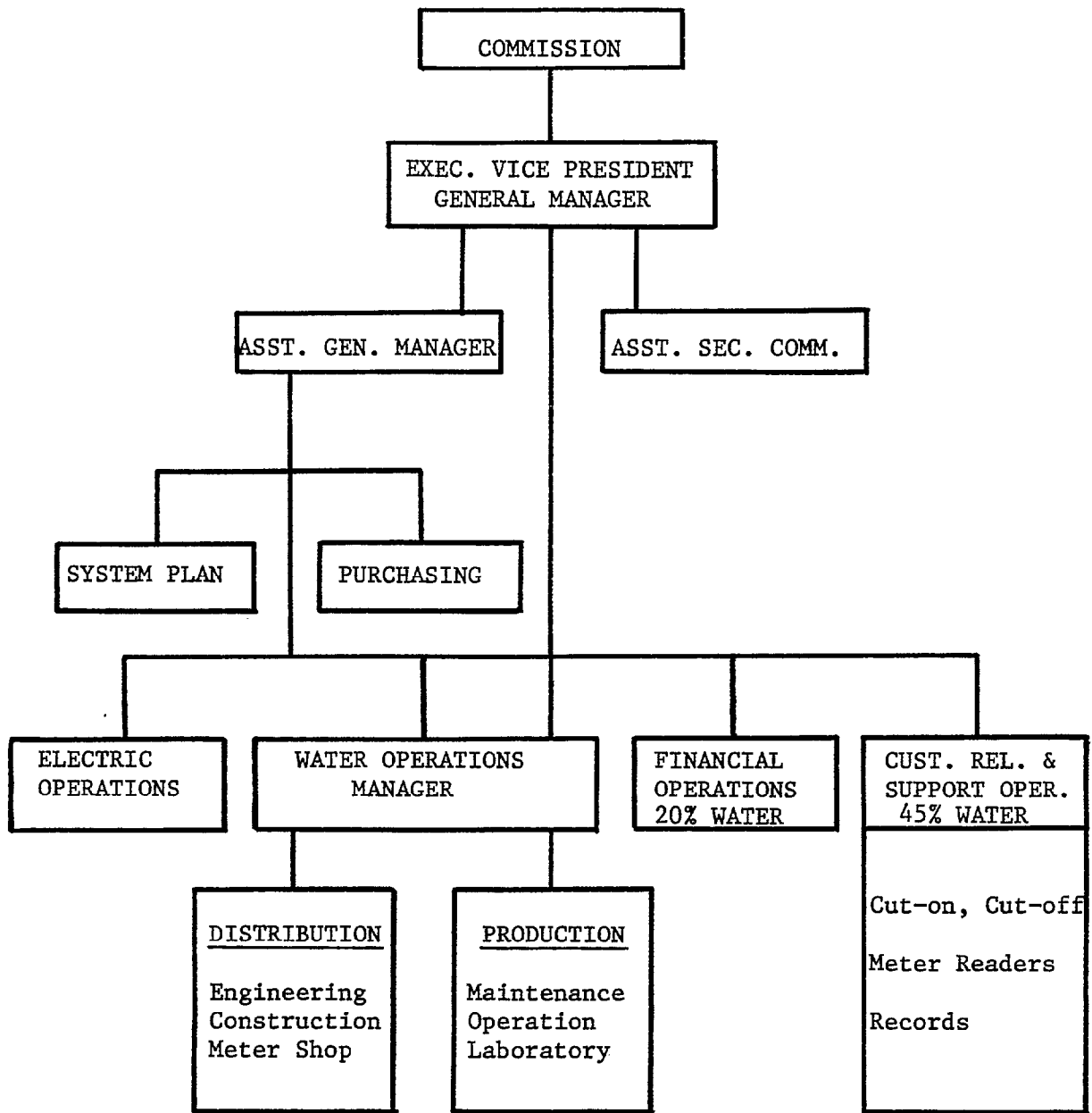


Figure 57. Orlando Water Utility organization chart.

relations and support operations were allocated to the function of water supply.

The major part of the water effort is accomplished under the water operations manager, who is responsible for all functions relating to acquiring, treating, and distributing water.

#### ACQUISITION

In the past, the Orlando utility obtained raw water from several lakes located in the city, moved the water through a treatment plant, and distributed it to the citizens. Because an abundance of high quality water was found to be available through deep wells reaching into the second aquifer directly under the city, the utility switched from the surface water to groundwater. The groundwater requires little treatment, and the wells are dispersed across the distribution area, so water is transported over short distances only.

All water is provided from 22 wells in the range of 2,000 ft deep. The source water is projected to meet the needs of the utility for the next 50 years. To meet the flow requirements, however, additional wells must be added.

#### TREATMENT

Because the source water is of high quality, only minimum treatment is necessary, and this takes place at the well or well fields. The water brought up from the well goes through an aerator to remove hydrogen sulfide, which gives the water an undesirable odor. Following aeration, chlorine is added to disinfect the water. For health purposes, fluoride is also added to the water. Figure 58 is a diagram of a treatment facility.

#### TRANSMISSION AND DISTRIBUTION

The Orlando system contains 958.8 miles of underground pipe. Most of this pipe is considered to be the distribution system as opposed to the transmission system. Transmission in the system is greatly reduced because of the geographical distribution of the well fields. Under normal operating conditions, the water is transported over relatively short distances. Each of the well fields is interconnected. The system is capable of functioning adequately with some of the wells down for maintenance.

The terrain of the service area is relatively flat, with a minimum elevation of 75 ft and a maximum elevation of 120 ft. At each well field there is a ground reservoir for storing water and an elevated storage tank to maintain pressure in the system. There are seven ground storage reservoirs and seven elevated storage tanks. All of the elevated storage tanks are 0.5 mil gal capacity, with the exception of one located at Copeland with a capacity of 1 mil gal. Total elevated storage capacity is 4 mil gal. Five ground storage reservoirs hold 2 mil gal each--one located at Highland holds

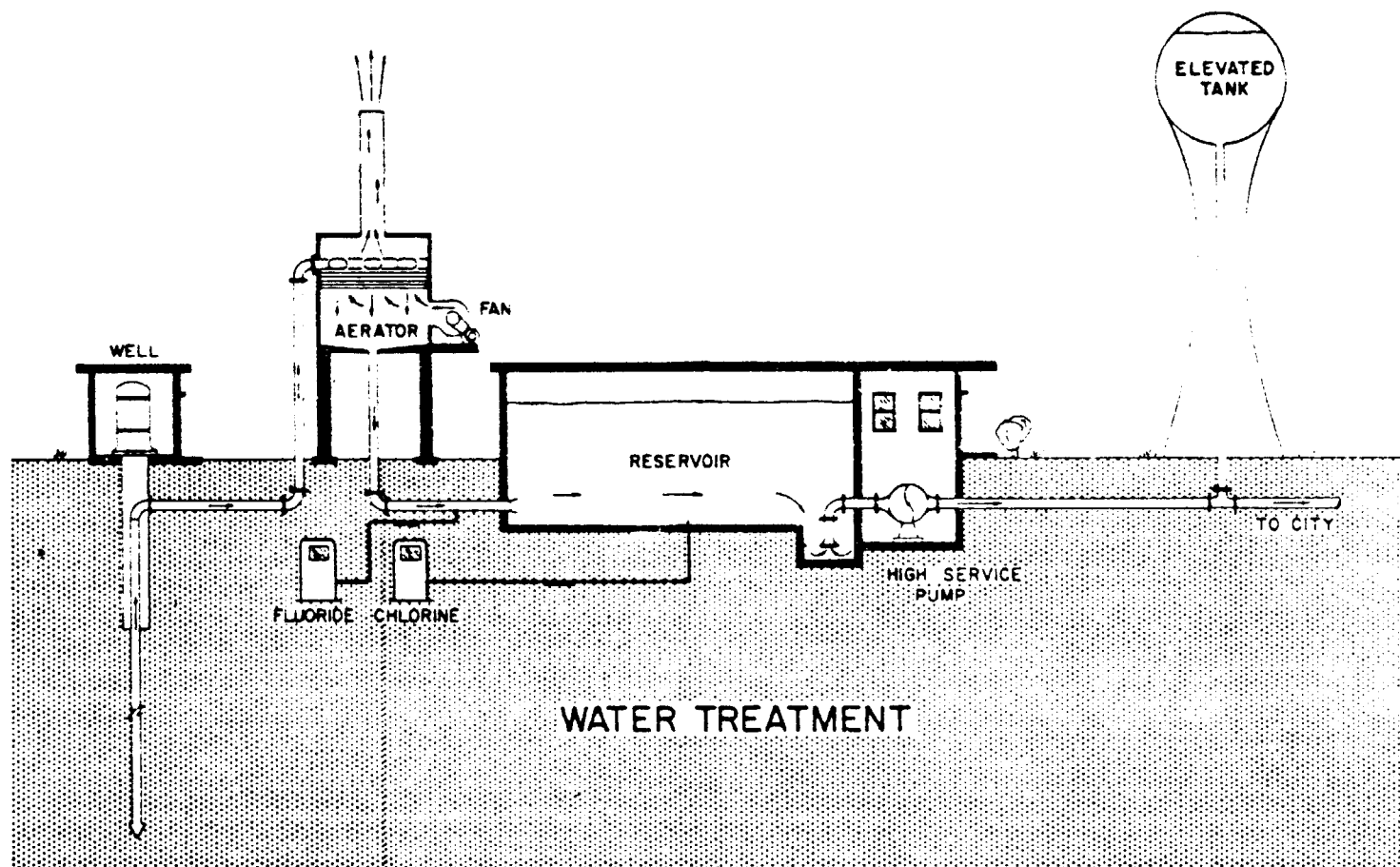


Figure 58. Orlando Water Utility flow diagram.

3.5 mil gal, and one at Martin holds 1 mil gal. The combined ground storage capacity is 14.5 mil gal. Tables 110 and 111 include information on system storage.

## COST ANALYSIS

The growth in consumer demand for water from 1965 through 1974 is illustrated in Figure 59. Revenue-producing water increased from 7,754 mil gal in 1965 to 12,522 mil gal in 1974. These figures reflect the amount of water billed to consumers during a given year. Treated water shown in the figure is the amount of water pumped from the wells for use by the city.

Using the standard cost categories, data were collected and reported as shown in Tables 112, 113, and 114. As indicated by the relative increase shown in support services, a major portion of the operating budget is expended for labor. Table 115 examines labor costs of operation and maintenance of the utility.

Table 115 shows total payroll hours required to produce 1 mil gal of RPW has remained approximately constant; therefore, one of the major influences in the increased cost of producing water is the increased labor cost.

Table 116 summarizes the operating, depreciation and interest expenses for the 10-year period of analysis. Table 117 computes capital and operating expenditure ratios. The operating expenses are those shown as a total of the values on Table 112--those incurred in the normal day-to-day operation of the system. The capital expenses are the total expenses for providing major equipment items and facilities plus the interest charged on money borrowed for those purposes.

A comparison of the operating and capital expense as a percentage of the total shows that at present, more expenses are associated with operations than with capital. At the beginning of the 10-year period, the ratio was approximately even between operating and capital expenses. Since that time, increasing costs of operation have changed the ratio.

In 1974, the ratio of 63% operations to 37% capital outlay reflected major investments made in years before the analysis. Slight increases in capital expenditures reflected only minor adjustments to the system. During the same period, a considerable increase occurred in the operating area because of increased man-hours and increased costs/man-hour. This, along with other increased operating costs, caused a more rapid increase in the operation and maintenance area than in the area of capital expense.

## SYSTEM COSTS

Examination of costs on a functional basis is only part of the total cost picture. Because the purpose of a water supply utility is to deliver water to a customer, it is important to present costs as they relate water delivery to a demand point in the system. For this reason, functional categories, both operating and capital, are reaggregated and assigned to physical

TABLE 110. ORLANDO WATER UTILITY ELEVATED WATER STORAGE.

Location	Ground elevation+ (ft)	Capacity (mil gal)	Overflow elevation (ft)
Oakridge	100.0	0.50	245.0
Rugby	105.2	0.50	235.6
Hazel	95.5	0.50	238.5
Copeland	107.0	1.0	238.0
Gore	107.2	0.50	476.2
Hiawassee	123.0	0.50	250.5
Martin*	101.0	0.50	255.0
Total	---	4.0	---

\* Owned by Martin Company.

+ Refers to mean sea level U.S. Geodetic Survey data.

TABLE 111. ORLANDO WATER UTILITY GROUND STORAGE RESERVOIRS.

Location	Discharge elevation* (ft)	Capacity (mil gal)
Kirkman	99.1	2.0
Highland	<b>87.0</b>	3.5
Primrose	107.6	2.0
Pine Hills	112.5	2.0
Kuhl	98.4	2.0
Martin	102.0	1.0
Conway	108.0	2.0
Total	---	14.5

\* Refers to mean sea level U.S. Geodetic Survey data.

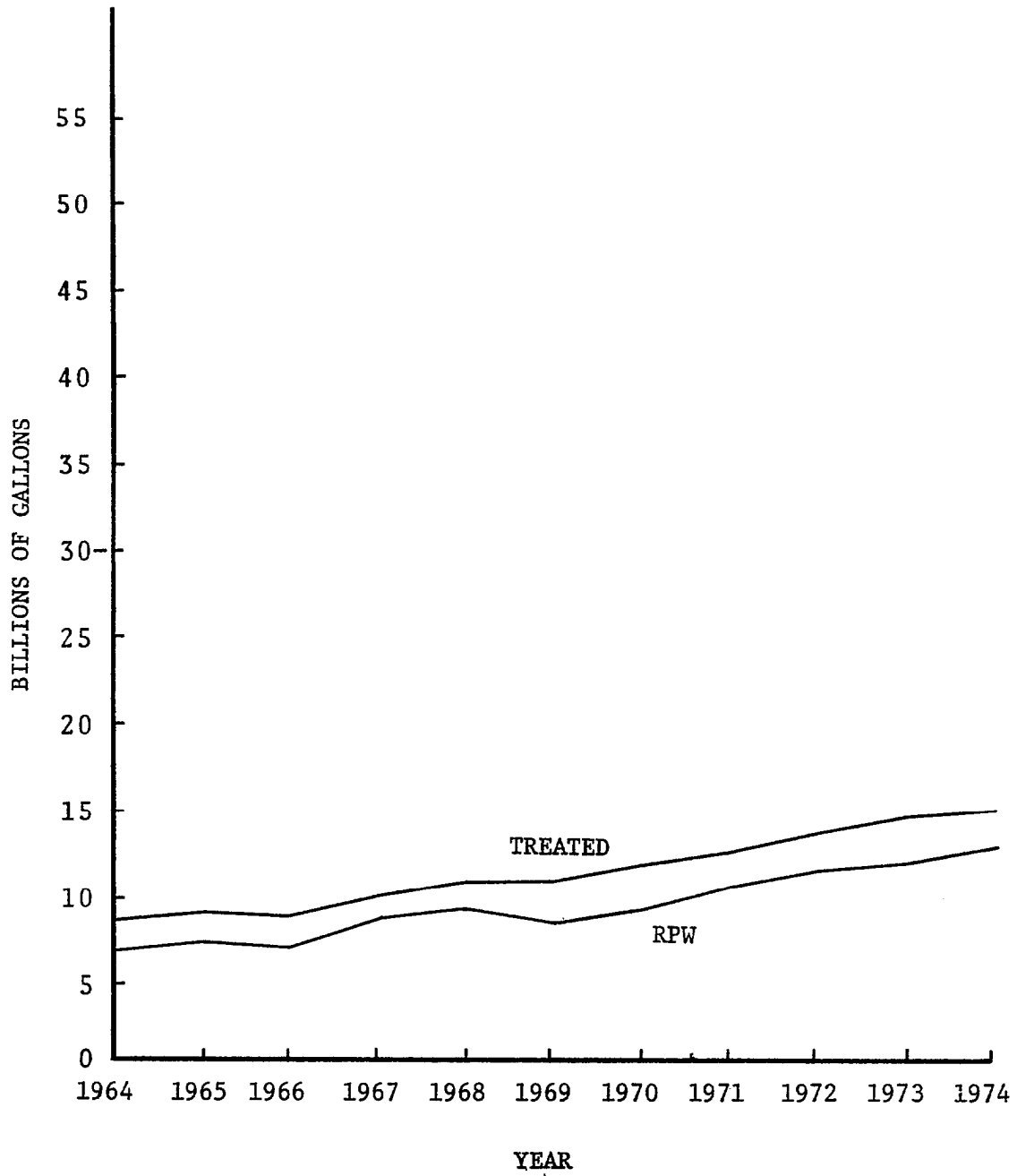


Figure 59. Orlando Water Utility water flow:  
treated water versus RPW.

TABLE 112. ORLANDO WATER UTILITY ANNUAL OPERATING COSTS

Category	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
<b>Support services:</b>										
Administration	\$208,855	\$217,473	\$266,481	\$326,220	\$344,976	\$416,604	\$402,293	\$357,009	\$445,506	\$538,277
Accounting and collection	157,884	161,708	176,254	225,385	292,054	320,545	362,433	376,510	421,139	496,316
Other	---	---	---	---	---	111,144	116,846	125,150	135,053	161,002
Total support services	366,739	379,181	442,735	551,605	637,030	848,293	881,572	858,669	1,001,698	1,195,595
<b>Acquisition:</b>										
Operating supervision and engr	2,571	2,958	6,272	6,562	6,623	7,162	8,084	10,482	14,483	15,445
Other operating	20,103	21,595	23,188	24,463	25,203	26,626	29,052	31,717	56,447	58,063
Maintenance	13,132	15,332	17,984	19,814	27,486	33,458	52,536	57,131	48,255	49,170
Other	7,221	7,975	8,674	11,394	13,090	16,102	---	---	---	---
Total acquisition	43,027	47,860	56,118	62,233	72,402	83,348	89,672	99,330	119,185	122,679
<b>Treatment:</b>										
Operating supervision and engr	1,543	1,775	3,763	3,938	3,974	4,297	4,850	6,289	8,690	9,267
Chemicals	29,324	26,810	35,415	37,072	35,783	35,132	37,744	42,690	44,209	41,738
Other operating	12,062	12,957	13,912	14,678	15,122	15,976	17,431	19,030	33,868	34,838
Maintenance	7,880	9,199	10,790	11,889	16,492	20,075	31,522	34,279	28,953	29,502
Other	4,332	4,785	5,205	6,836	7,854	9,661	---	---	---	---
Total treatment	55,141	55,526	69,085	74,412	79,225	85,141	91,547	102,288	115,720	115,345
<b>Power and pumping:</b>										
Operating supervision and engr	6,171	7,100	15,053	15,750	15,896	17,189	19,401	25,158	34,758	37,069
Raw water power	29,758	25,670	38,360	35,717	38,373	44,551	112,712	139,509	149,597	208,096
Finished water power	88,663	82,914	102,894	88,542	92,259	122,859	137,383	170,511	182,841	248,160
Other operating	48,249	51,828	55,650	58,711	60,488	63,902	69,724	76,120	135,472	139,351
Maintenance	31,519	36,795	43,160	47,555	65,967	80,300	126,087	137,114	115,813	118,009
Other	17,330	19,141	20,819	27,345	31,417	38,645	---	---	---	---
Total power and pumping	221,690	223,418	275,936	273,620	304,400	367,446	465,307	548,412	618,481	750,691
<b>Transmission and distribution:</b>										
Supervision and engineering	39,302	43,913	60,735	80,471	91,666	100,459	111,869	7,078	61,105	102,561
Meters	81,190	84,132	87,581	93,058	95,398	97,077	103,761	108,352	122,551	153,531
Maintenance	137,086	167,555	145,634	145,309	149,440	190,497	185,843	256,950	297,280	302,723
Other	90,411	110,041	97,441	125,415	147,706	125,186	229,650	161,779	265,150	347,857
Total transmission and distr	347,989	405,641	391,391	44,253	484,210	513,219	631,123	534,159	746,086	906,672
<b>Total</b>	<b>1,034,586</b>	<b>1,111,656</b>	<b>1,235,265</b>	<b>1,406,123</b>	<b>1,577,267</b>	<b>1,897,447</b>	<b>2,159,221</b>	<b>2,142,858</b>	<b>2,601,170</b>	<b>3,090,976</b>

TABLE 113. ORLANDO WATER UTILITY UNIT OPERATING COSTS (\$/mil gal RPW)

Category	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
<b>Support Services:</b>										
Administration	\$26.94	\$30.15	\$29.63	\$33.88	\$40.05	\$43.52	\$37.66	\$31.38	\$38.37	\$42.99
Accounting and collection	20.36	22.42	19.59	23.40	33.91	33.48	33.93	33.09	36.27	39.64
Other	---	---	---	---	---	11.61	10.94	11.00	11.63	12.86
Total support services	47.30	52.56	49.22	57.28	73.96	88.59	82.53	75.47	86.28	95.48
<b>Acquisition:</b>										
Operating, supervision and engineering	0.33	0.41	0.70	0.68	0.77	0.75	0.76	0.92	1.25	1.23
Other operating	2.59	2.99	2.58	2.54	2.93	2.78	2.72	2.79	4.86	4.64
Maintenance	1.69	2.13	2.00	2.06	3.19	3.49	4.92	5.02	4.16	3.93
Other	0.93	1.11	0.96	1.18	1.52	1.68	---	---	---	---
Total acquisition	5.55	6.63	6.24	6.46	8.41	8.70	8.39	8.73	10.27	9.80
<b>Treatment:</b>										
Operating, supervision and engineering	0.20	0.25	0.42	0.41	0.46	0.45	0.45	0.55	0.75	0.74
Chemicals	3.78	3.72	3.94	3.85	4.15	3.67	3.53	3.75	3.81	3.33
Other operating	1.56	1.80	1.55	1.52	1.76	1.67	1.63	1.67	2.92	2.78
Maintenance	1.02	1.28	1.20	1.23	1.91	2.10	2.95	3.01	2.49	2.36
Other	0.56	0.66	0.58	0.71	0.91	1.01	---	---	---	---
Total treatment	7.11	7.70	7.68	7.73	9.20	8.89	8.57	8.99	9.97	9.21
<b>Power and pumping</b>										
Operating, supervision and engineering	0.80	0.98	1.67	1.64	1.85	1.80	1.82	2.21	2.99	2.96
Raw water power	3.84	3.56	4.26	3.71	4.46	4.65	10.55	12.26	12.89	16.62
Finished water power	11.43	11.49	11.44	9.19	10.71	12.83	12.86	14.99	15.75	19.82
Other operating	6.22	7.18	6.19	6.10	7.02	6.67	6.53	6.69	11.67	11.13
Maintenance	4.06	5.10	4.80	4.94	7.66	8.39	11.80	12.05	9.98	9.42
Other	2.23	2.65	2.31	2.84	3.65	4.04	---	---	---	---
Total power and pumping	28.59	30.97	30.68	28.41	35.34	38.38	43.56	48.20	53.27	59.95
<b>Transmission and distribution</b>										
Supervision and engineering	5.07	6.09	6.75	8.36	10.64	10.49	10.47	0.62	5.26	8.19
Meters	10.47	11.66	9.74	9.66	11.08	10.14	9.71	9.52	10.56	12.26
Maintenance	17.68	23.23	16.19	15.09	17.35	19.90	17.40	22.58	25.61	24.18
Other	11.66	15.25	10.83	13.02	17.15	13.07	21.50	14.22	22.84	27.78
Total transmission and distribution	44.88	56.23	43.51	46.13	56.22	53.60	59.08	46.95	64.26	72.41
<b>Total</b>	<b>133.43</b>	<b>154.10</b>	<b>137.33</b>	<b>146.01</b>	<b>183.13</b>	<b>198.17</b>	<b>202.14</b>	<b>188.33</b>	<b>224.05</b>	<b>246.84</b>

The above figures are not additive. They are obtained by dividing yearly mil gal RPW into the annual costs shown in the preceding table.

[illegible]

TABLE 115. ORLANDO WATER UTILITY LABOR COST ANALYSIS

Item	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Total payroll (\$)	535,664*	549,753	547,621*	600,879*	705,551*	779,012	846,319	1,214,955	1,464,267	1,571,133
Total hours on payroll	299,722	304,166	301,338	318,890	348,404	373,677	381,525	420,211	467,462	463,881
Revenue-producing water (mil gal)	7,754	7,214	8,995	9,630	8,613	9,575	10,682	11,378	11,610	12,522
Total payroll/mil gal RPW (\$)	69.08	76.20	60.88	62.39	81.91	81.35	79.22	106.78	126.12	125.46
Total hours/mil gal RPW	38.65	42.16	33.50	33.11	40.45	39.02	35.71	36.93	40.26	37.04
Average cost/man-hour (\$)	1.78	1.80	1.81	1.88	2.02	2.08	2.21	2.89	3.13	3.38

\* Figures include overtime estimates.

TABLE 116. ORLANDO WATER UTILITY CAPITAL AND OPERATING COSTS

Item	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Operating expense	\$1,034,586	\$1,111,656	\$1,235,265	\$1,406,123	\$1,577,267	\$1,897,448	\$2,159,220	\$2,142,858	\$2,601,170	\$3,090,976
Depreciation	548,523	561,531	585,199	630,875	680,239	589,399	633,827	683,298	737,358	773,868
Interest*	475,513	447,280	409,968	407,447	396,729	393,518	617,578	923,338	926,271	1,065,954
Total	2,058,622	2,120,467	2,230,432	2,444,445	2,264,235	2,880,365	3,410,625	3,749,494	4,265,799	4,930,798
Total cost/mil gal RPW	265.49	293.94	247.96	253.83	308.18	300.82	319.28	329.53	367.44	393.77

\* Calculated as 20% of total interest cost, including amortization, adjustments, and other interest costs.

TABLE 117. ORLANDO WATER UTILITY CAPITAL VERSUS OPERATING EXPENSE RATIOS

Item	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Operating expense (\$)	1,034,586	1,111,656	1,235,265	1,400,123	1,577,267	1,897,448	2,159,220	2,142,858	2,601,170	3,090,976
Capital expense (\$)	1,024,036	1,008,311	995,167	1,038,322	1,076,968	982,917	1,251,405	1,606,627	1,664,629	1,839,822
Total (\$)	2,058,622	2,120,467	2,230,432	2,444,445	2,654,235	2,880,365	3,410,625	3,749,494	4,265,799	4,930,798
Operating expense as % of total	50.26	52.43	55.38	57.52	59.42	65.88	63.31	57.15	60.98	62.69
Capital expense as % of total	49.74	47.57	44.62	42.48	40.58	34.12	36.69	42.85	39.02	37.31

components in the water delivery system. This section contains such an analysis of the water supply system costs.

Locations of the Orlando Water Utility facilities are shown in Figure 60. The dots represent the well fields along with the treatment and storage facilities. As shown, the Orlando Utility's system is simple and laid out so that no booster stations are required. Elevation of the storage facilities is shown in Table 110.

To analyze the cost of water as it moves through acquisition to treatment to the consumer, it is necessary to identify the capital and operating costs for each system component. Figure 61 is a schematic diagram of the functions of the Orlando utility and shows the operating and capital costs for each function. Each of the well fields is operated similarly. Low service pumping removes the water from the wells and moves it through the aeration and chlorination and into the ground reservoir storage. High service pumping moves the water into elevated storage and into the distribution system. Because the function of each well field is similar, the flow chart is representative of all well fields in the system.

The incremental cost of providing water to the distribution system is \$101.35/mil gal. Added to the incremental cost are those for distribution, interest, and support services, as follows:

Costs:

Incremental cost (\$/mil gal)	\$101.35
Distribution cost (\$/mil gal)	96.63
Interest (\$/mil gal)	85.12
Support services cost (\$/mil gal)	110.31
Total (\$/mil gal)	393.41
Metered consumption (mil gal)	12,522.1
Revenue (\$)	4,926,319.36

Distribution cost is calculated on the assumption that these unit costs are constant throughout the system. The total capital and operating cost for the distribution system is therefore divided by the number of gallons of RPW in the year under consideration, yielding a figure of \$96.63/mil gal. The same approach is taken for interest and support services. When these costs are added, the total cost is \$393.41/mil gal. This value multiplied by the annual metered consumption produces the total cost of water production for the year. Table 118 gives the current water rates.

Revenue-producing water for the 10 largest consumers served by the Orlando utility is shown in Table 119.

Locations of the major users in order of their consumption are shown in Figure 62. Because the water sources are well distributed, the cost of delivering water to each user is approximately the same.

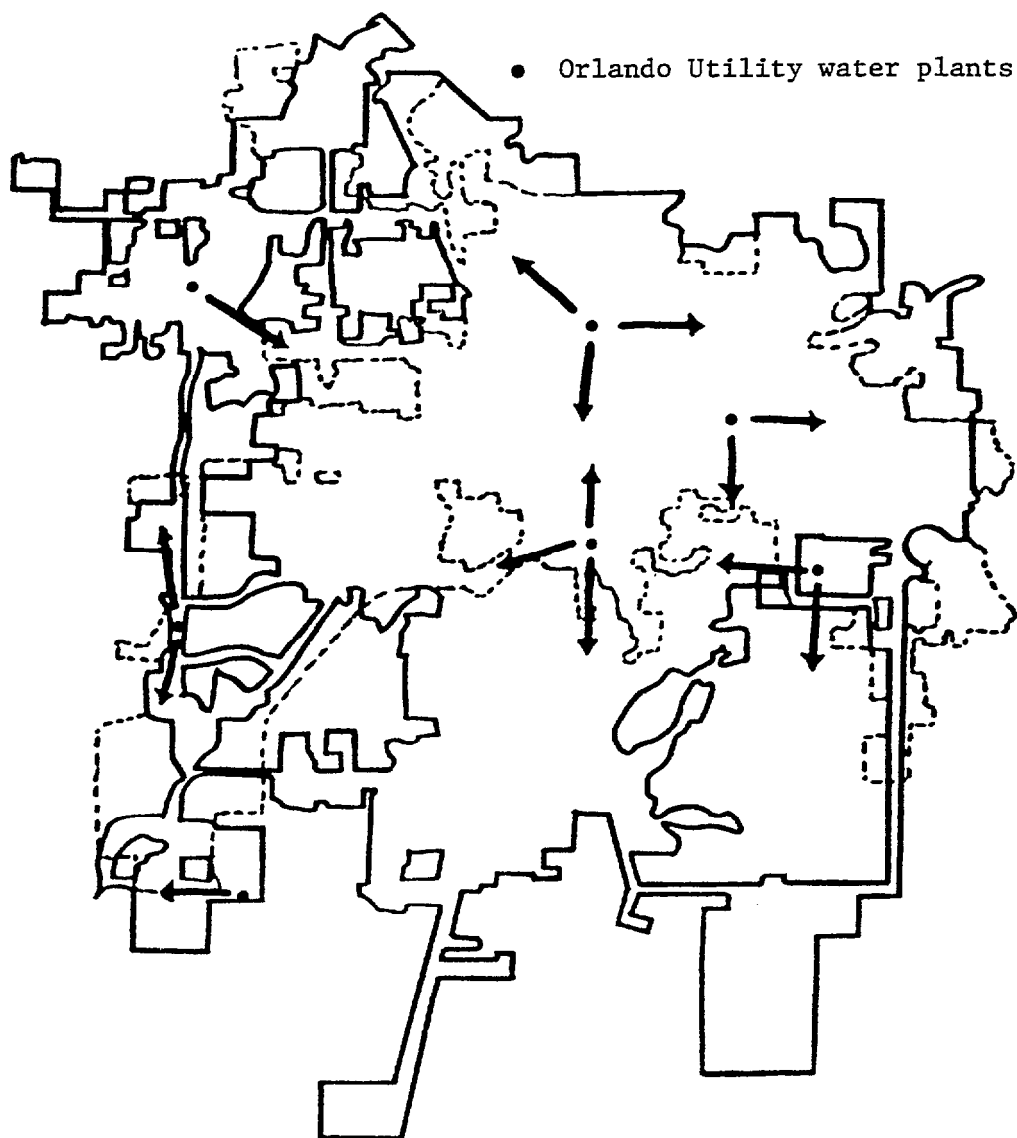
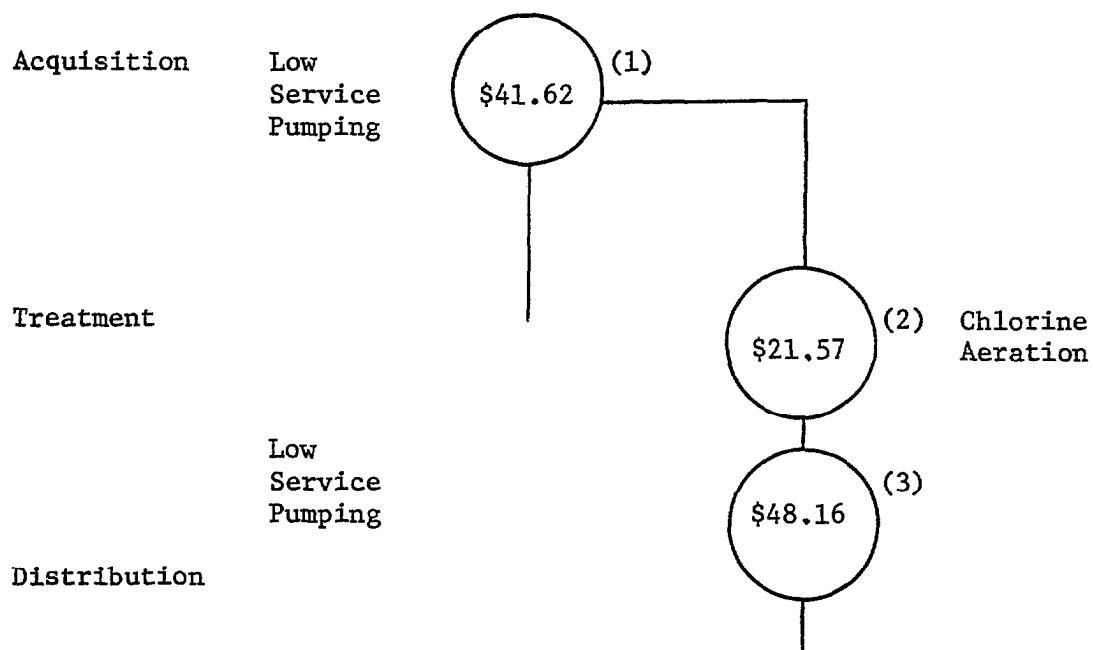


Figure 60. Orlando Water Utility flow map.



- (1) Includes power and depreciation + \$15/mil gal unidentifiable O&M expenses.
- (2) Includes chemical and depreciation = \$9.09/mil gal unidentifiable O&M expenses.
- (3) Includes power and depreciation + \$15/mil gal unidentifiable O&M expenses.

Figure 61. Orlando Water Utility allocation of capital and operating expenses to water system components (\$/mil gal RPW).

TABLE 118. ORLANDO WATER UTILITY WATER RATES.

Blocks	January 1, 1974	January 1, 1975	July 1, 1975
Inside city:			
0 - 1	---	---	\$1.85
0 - 4	\$2.60	\$2.67	---
5 - 10	.33	.35	---
11-50	.32	.35	---
2 - 100	---	---	.41
51-100	.29	.35	---
101 +	.21	.25	.31
Outside city:			
0 - 1	---	---	2.54
0 - 4	3.57	3.67	---
5 - 10	.45	.48	---
11 - 50	.44	.48	---
2 - 100	---	---	.56
51 - 100	.39	.48	---
101 +	.38	.34	.42

TABLE 119. ORLANDO WATER UTILITY RPW OF 10 MAJOR USERS

Major user	High or low date	Date	Units used (mil gal)	Amount billed	Unit charge (\$/MG)		Cost zone
					With tax	Without tax	
Navy	High	Oct 74	49.6	\$10,432.46	---	\$210.21	1
	Low	Mar 75	37.6	9,409.27	---	250.30	
Martin	High	Jan 75	38.1	3,816.80	---	100.21*	1
	Low	Jun 75	28.5	2,860.00	---	100.28*	
Coca Cola	High	Jun 75	7.1	1,785.27	\$107.41	251.16*	1
	Low	Jan 75	3.0	772.02	66.88	253.70*	
Habitat	High	Apr 75	2.1	540.02	54.00	255.33	1
	Low	Oct 74	0.4	95.84	9.58	236.06	
Florida Hospital	High	Nov 74	5.0	1,068.56	78.74	212.10	1
	Low	Sep 75	2.5	776.21	67.05	314.67	
American Bakeries	High	Jun 75	5.9	1,491.02	408.48	251.90*	1
	Low	Jan 75	4.1	1,041.53	331.51	252.73*	
Frito Lay	High	Aug 75	9.0	2,788.11	147.52	311.28*	1
	Low	Oct 75	5.7	1,765.11	106.60	312.02*	
Royal Crown	High	Oct 74	8.9	1,879.58	255.59	211.19	1
	Low	Apr 75	3.6	906.27	205.40	253.15	
Orange Memorial	High	Oct 74	6.7	1,411.49	92.46	211.59"	1
	Low	Dec 74	4.1	862.13	70.49	212.86*	
Sheraton Olympic	High	Aug 75	6.8	2,879.96	---	422.34	1
	Low	Feb 75	0.7	237.09	---	364.19	

\* Rate increases occurred January 1, 1975 and July 1, 1975.